Indoor Air Quality Monitor

February 2002 **North Dakota Department of Health**

Eye on Events

Radon/IAQ Seminar

The National Environmental Health Association (NEHA) administers a program that trains health professionals to implement indoor air quality and radon community action plans. The next training session is scheduled March 13 to March 15, 2002, in Washington D.C. To register or for more information, visit www.neha.org or contact Larry Marcum at 303.756.9090 ext. 303 or via e-mail at lmarcum@neha.org

Fundamentals of IAQ

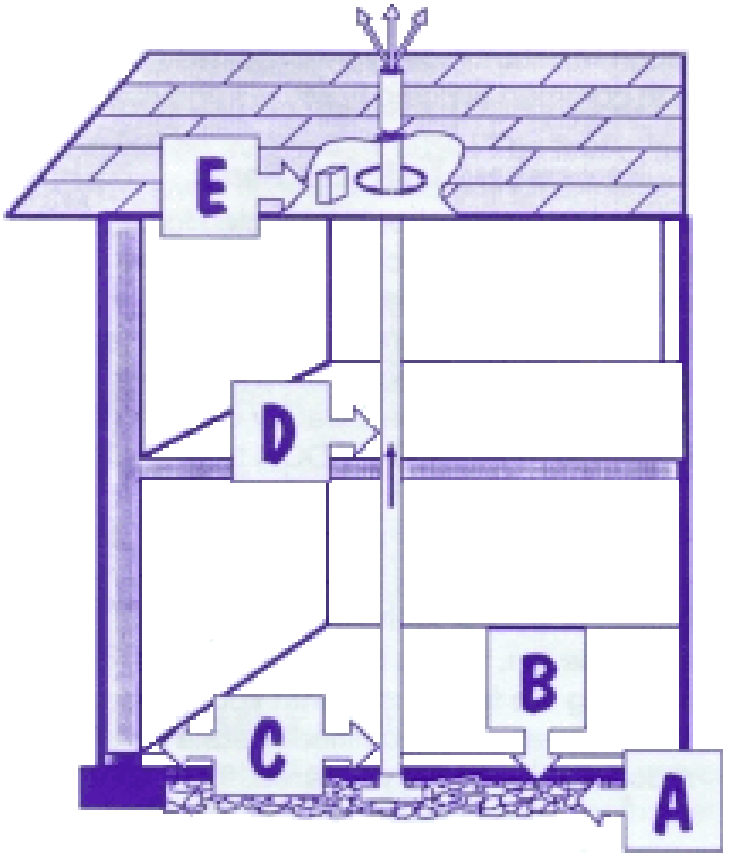
"Fundamentals of Indoor Air Quality," a two-day seminar sponsored by The Association of Energy Engineers (AEE) and the Environmental Engineers & Managers Institute of AEE will be held in Dallas, Texas, March 13 and 14, 2002. For more information, call 770.447.5083, ext. 223.

Radon-Resistant New Home Construction

Radon is a colorless, odorless gas that is found in soil and that can enter buildings through cracks and openings in foundations.

Estimated to claim about 20,000 lives each year, radon is the second leading cause of lung cancer in the United States.

The best method for reducing radon levels in a building is a radon reduction system, known as a sub-slab depressurization system. An effective radon reduction system can reduce radon levels by an average of 50 percent and, in most cases to levels below the U.S. Environmental Protection Agency's (EPA) action level 4 pCi/L.



The North Dakota Department of Health recommends that home builders consider constructing new homes to be radon resistant.

Installing a radon reduction system during construction of a new home instead of installing the system after the home is built can save a substantial amount of money. On average, a radon reduction system installed during construction costs about $200 to $500. Waiting until after the building is constructed may cost between $1,200 and $2,500.

Installing a radon reduction system is simple. No special skills are required and installation is done with materials that are commonly used in construction.

The basic components of a radon reduction system are a gas permeable layer (A in the picture above), plastic sheeting (B), sealing and caulking the foundation (C), a vent pipe (D), and a junction box (E). (Radon ... *cont. page 2*)

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The permeable layer, usually consisting of gravel, allows soil gases such as radon to move freely beneath the home. The plastic sheeting, sealing and caulking reduce the ability of soil gases to enter the home. The vent pipe allows the soil gases to escape into the outside atmosphere without entering the home. Finally, the junction box provides the needed connection for the installation of a fan if it is necessary to reduce radon levels further.

For more information about radon, contact the North Dakota Department of Health at 701.328.5188. Additional information may be found on the department's website at www.health.state.nd.us .

Common Moisture Problems in Buildings

Excessive moisture within a building creates conditions that are conducive for the growth of mold and mildew and that can lead to elevated concentrations of other microorganisms such as bacteria and dust mites. Excessive indoor moisture also can create structural problems and make building occupants uncomfortable.

Moisture can enter a building in many ways. Insufficiently sloped landscaping, elevated or perched ground-water tables, plugged rain gutters and inadequately extended downspouts can each contribute greatly to wet basements.

Leaky roofs and pipes can create moisture problems in a building. Domestic activities such as cooking, washing and drying clothes, and bathing or showering can add moisture to indoor air.

Houseplants, aquariums and firewood stored indoors also can contribute to indoor humidity. In fact, people themselves produce about three pints of water vapor per day while breathing. The table below shows various moisture sources and estimated amounts of moisture each may produce.

The best way to address moisture problems is to address moisture-producing sources. Dehumidification alone is treating the symptoms of the moisture problem and not the source.

The following steps will help to control indoor moisture:

- Fix broken pipes and leaking roofs.
- Clean rain gutters and extend downspouts away from the building.
- Landscape to ensure adequate slope to drain surface water away.
- Utilize drain tile and a sump pump to control ground water.
- Consider sub-slab depressurization to help prevent soil moisture from entering.
- Ensure that attics are adequately vented.
- Utilize kitchen and bathroom exhaust fans while cooking, showering or bathing. (Always vent exhaust fans outside.)
- Vent clothes dryers and combustion appliances outdoors.
- Do not dry or store wet materials inside.
- Utilize more energy-efficient windows and insulation to help reduce condensation.
- Dehumidify localized humidity problems.

Bath (excludes towels and spillage)	0.12 pints/average size bath
Shower (excludes towels and spillage)	0.52 pints/5-minute shower
Clothes washing	0+ pints/load (usually nil)
Clothes drying	
– vented outdoors	0+ pints/load (usually nil)
– not vented outdoors or indoor line drying	4.68 to 6.18 pints/load (more if gas dryer)
Cooking	0.35 to 2.8 pints/meal
Dishwashing	0.21 to .68 pints/load
Mopping Floor	0.03 pints/square foot
Human respiration	0.44 pints/hour (family of four, average)
Houseplants (five to seven large plants)	0.86 to .96 pints/day
Firewood	400 to 800 pints/6 months
Humidifiers	0 to 120+ pints/day (2.08/ average/hour)
Saunas, steambaths, and whirlpools	0 to 2.7+ pints/hour
Evaporation from building materials	
– seasonal	6.33 to 16.91 pints/day
– new construction	10+ pints/day
Seasonal outdoor humidity	64 to 249+ pints/day
Ground moisture migration	0 to 105 pints/day

Source: Minnesota Extension Service, University of Minnesota.

IAQ Colleague

Kenneth Hellevang, Ph.D., P.E.

This issue's IAQ colleague is Ken Hellevang, a Professor at North Dakota State University (NDSU).

Ken has a doctorate in engineering and is a registered professional engineer. As an extension engineer at NDSU Extension Service, Ken provides education and technical assistance in indoor environmental engineering.

Ken serves as the North Dakota coordinator for the U.S. EPA sponsored program, "Healthy Indoor Air for America's Homes."

Some of Ken's IAQ publications have been distributed nationwide by the U.S. Departments of Housing and Urban Development (HUD)and Agriculture (USDA). The USDA has awarded Ken for his efforts in flood recovery and for his work with home moisture problems.

Ken grew up in South Dakota but now lives in Fargo with his wife and three children. Ken likes being involved with his kids. He is a Boy Scout leader and soccer coach.

Tool Talk: Indoor Air Quality Equipment Review

Arguably, the most important piece of equipment for an indoor air quality (IAQ) investigation is your own senses. What you see, smell, hear and touch (tasting is not usually wise) often can tell you what you need to know in order to accurately assess a problem and make recommendation(s) to correct the problem.

Your sense of sight can provide you with vital, revealing information about what is going on in a building that might affect indoor air quality. Look for discolored building materials, pools of water or chemicals, the condition of chemical containers, and the general appearance of the building.

When you find something that looks "wrong," take the time to investigate further. Sometimes an IAQ problem can be revealed by investigating what appears to be small and harmless on the surface.

Another important visible clue is in what the building occupants are doing. Frequently use of fans may indicate inadequate air movement. If they open windows when it is -20° F outside, they may be too hot or feel like they need more fresh air.

Your nose can help you with what your eyes can't see or can confirm what your eyes have found. Odors are common IAQ problems. Identifying odors and finding their source can be difficult.

Some odors that can cause IAQ problems include sewer gas, mold (typically a wet, musty odor), exhaust fumes and chemical odors. Identifying an unknown odor is easy if you can find the source. Odors are typically stronger near the source so, follow your nose.

Your sense of hearing also can provide you with valuable clues to solve an IAQ problem. Talking with building occupants sometimes can give you information that can narrow your search and even lead you right to the problem.

When discussing an IAQ problem with a building occupant, try to get information that might reveal a timing or spatial pattern.

Finding out occupant symptoms may help to identify what the problem is. For timing patterns, find out when symptoms started, if they get stronger or weaker at certain times or if they go away. For spatial patterns, find out where occupants are when problem is worse or better and where the occupants spend their time.

Your hearing also can help during a building inspection. Unusual sounds can be a clue to a building mechanical system or component not functioning properly.

Although less utilized in solving an IAQ problem, your sense of touch can be helpful too. Feeling a surface can reveal if it is dry or wet, clean or dirty.

When an IAQ problem presents itself, use the best equipment available to you – your senses. But, be careful! Hazards such as hot surfaces, sharp edges, loud noises, dangerous fumes and live wires can damage your equipment beyond repair and replacement is not usually an option. To prevent accidents, use your head when dealing with these hazards; consider wearing gloves, boots, ear muffs/plugs, protective eye-wear or respiratory protection when needed.

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